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THE OAK AND THE ASH.

WEATHER proverbs, like most other things, are of various quality. Far be it from us to assign rank to any of them, but their antiquity alone entitles them to careful consideration before they are swept away (in this utilitarian age) as mere rubbish.

At a recent meeting of the Woolhope Naturalists' Field Club, the various proverbs depending upon the priority of leafage of the Oak and the Ash were treated with such a fulness as we have not before seen. We therefore reprint the account from the *Hereford Times*, and add at the end some versions not referred to therein.—[ED.]

Mr. Moore, in the absence of their author, read the following few notes, prepared by Dr. T. A. Chapman, on "If the Oak," &c.:—

If the Oak is in leaf before the Ash,
'Twill be dry and warm, and good wheat to thrash;
If the Ash is in leaf before the Oak,
'Twill be cold, and, of rain, too great a soak;
If the Oak and the Ash open their leaves together,
Expect a summer of changeable weather.

If the Oak is out before the Ash,
'Twill be a summer of wet and splash;
But if the Ash is before the Oak,
'Twill be a summer of fire and smoke.

There are several versions of this piece of weather-lore, an old Kentish one being "Oak, smoke; Ash, quash," and according to a version given in *Notes and Queries* (1st series, vi. 71):—

If the Oak's before the Ash,
Then you'll only get a splash;
If the Ash precedes the Oak,
Then you may expect a soak.

The Folk-lore of Plants, Thistleton Dyer, p. 117.

Two versions of these rhymes are to be met with, whose prophecies are diametrically opposed; it is enough for me at present to take them as a proof that common observation asserts that the leafing of these two trees varies in different seasons, sometimes one and sometimes the other acquiring its foliage earlier in spring than its fellow.

This year it has been a matter of frequent remark that the oak is notably in advance of the ash.

I have very little to say except to record this circumstance, and to inquire what is known about the matter.

I may first give a few dates which, for two reasons, are only approximate; firstly, that it is difficult to say precisely what advance in growth may be decided to be "in leaf;" and secondly, trees of the same species may differ from each other by a week or more in their forwardness.

April 20.—Ash in flower.

April 29.—Ash in leaf in hedges (not hedgerow trees, but ashes cropped with the hedge).

May 6.—Oak leaves may be found on trees.

May 6.—Ash buds (on trees) barely swelling.

May 17.—Oaks well in leaf.

May 17.—Most ash trees quite bare; shoots perhaps 2 inches long.

May 17.—Oaks in hedges leafless, though buds well grown.

May 22.—Oaks in hedges still to be be found without decided leaves; and

May 22.—Ash trees without leaves.

About the 6th of May, when an oak leaf about an inch long could be readily found, the season for oaks was about 18 days behind an ordinary season. So rapid has been the progress since that date, that at present, May 23rd, trees that submit to forcing are at about a stage normal to the season.

On May 17th oaks were generally well in leaf; that is, there were shoots of several inches long and leaves fairly developed. At that date many ash trees showed nothing like a leaf, and the most forward were only at about the stage reached by oaks on May 6th, and even yesterday, May 22nd, I saw an ash tree with buds only just breaking, whilst most oak trees now have full-sized leaves.

But there is another circumstance that is very curious, though few, I think, have noticed it, and that is that when ash and oak have been cropped in hedges, the reverse state of matters holds. Well-developed ash leaves could be found in hedges on April 29th, and on May 5th all such specimens were fairly in leaf. Yet on May 17th many oaks clipped in hedges had buds swelled to an inch or two in length, yet without anything like a leaf.

I think that these dates are well to be noted; the only comment I would make on them would be in the form of a few questions.

Firstly, and most radically, does the ash ever leaf before the oak? The ash always blossoms a week or two, more often four or five weeks, before it breaks into leaf. For the last few years the ash has blossomed very freely, and many trees thereby put on a clothed, not exactly leafy appearance, very early. This year the ash has hardly bloomed at all, and the first movement seen has been the bursting of the leaf bud. My inquiry is, therefore, whether the supposed variation in the date (relative to the oak) at which the ash bursts into leaf,

is not in reality merely a variation in the amount of blossom it bears?

The hedge plants behave this year in a way to suggest that the ash may, under certain conditions, leaf first. My next query would be, why this remarkable difference between trees and plants cropped to bush size and protected in hedges? If it is the warmth afforded by the protection of the hedge that forces on the ash, why does it not force on the oak?

I have noticed that many oaks leaf first at the top, whilst ash trees are apt to be latest there, and ash suckers leaf earlier than trees.

If the relative dates of leafing are reversed in the two trees in different seasons, we can only suppose that one tree breaks into leaf after a long-continued moderate temperature, but is not rapidly affected by a higher temperature, whilst the other does not move at the temperature suitable to the former, but advances rapidly at a slightly higher temperature. Should this be so, which is the tree that moves at the lower temperature? Has anything accurate been recorded on the subject?

After the paper had been read, the President (Mr. H. Southall), said that he had received two answers to inquiries he had made respecting the subject Mr. Gulson, a very good observer, in writing to the *Coventry Herald*, June 7th, says:—"The newspapers contain the usual observations that the oak is in leaf before the ash, and predict the wet or dry season which they suppose is to follow. As I have never observed any season in which the oak was not in leaf before the ash, I am unable to say what force there is in such predictions."

Now follows a letter from Mr. Westley Richards, dated June 7th, 1889:—

"Dear Sir,—Mr. Symons informs me that you have been keeping records about the oak and the ash. This year, in my county (Rutland), the oak was decidedly out much before the ash, and we had 5·75 inches of rain, and it is one of the best grass years I remember. This does not agree with the proverb I enclose:—

When buds the Oak before the Ash,
You'll only have a summer splash.

I do not remember to have had 5·75 in. of rain in May before.—Yours faithfully, WESTLEY RICHARDS."

From a newspaper cutting of a letter, signed John Thomson, Tweedside, June 2nd, 1889:—

Oak and ash. The rhyme varies in words, but its meaning is always the same, thus—

When buds the Oak before the Ash,
You'll only have a summer splash;
When buds the Ash before the Oak,
You'll surely have a summer soak.

That is, oak and soak rhyme together, and ash and splash. G. A. H.

The appearance of the ash in this part of Herefordshire must be very different from that it presents in North Radnorshire as described by Mr. G. A. Haig. Here it is almost impossible this season to state with rigorous exactness whether the oak or the ash has priority. A great many trees of each species as yet show scarcely any signs of energetic vitality, while an equal number are well adorned in frondescence, both oaks and ashes vying with each other. On the borders the rhyme runs :—

The Ash before the Oak,
Choke, choke, choke ;
The Oak before the Ash,
Splash, splash, splash.

Considerable weight attaches to arboreal and other signs in this part of the country, and had the ash been as advanced as it is in North Radnorshire, instead of a wet summer, as anticipated by Mr. Haig, a very dry season would have been confidently looked for.

The President then made a few remarks on the peculiarity of the present season in Herefordshire, saying that the three spring months of March, April, and May, of 1889, were wetter than any corresponding period since observations were first taken in this county in 1818, the amount being as under :—

	Total inches.	Rainy days.
March	3·28 ...	18
April	5·64 ...	22
May	3·81 ...	18
	12·73	58

or more than double the average fall, the fall in April being three times the usual quantity. Another striking fact had been the absence of frost. Since March 26th there had been no frost at Ross at 4 ft. from the ground. During May, the lowest temperature in the screen was 42°·4, on May 1st and 2nd ; this appears to be unparalleled, and perhaps explains the unusual prevalence of insect life which, in some places, has been so destructive.

[The following are other versions which we have found.—ED.] :—

Oak before Ash,
Have a splash ;
Ash before Oak,
Have a soak.

If the Oak before the Ash comes out,
There has been, or there will be, drought.
"*Proverbial Folk-lore.*"—ANON, N.D.

When the Oak comes out before the Ash, there will be fine weather in harvest ; but when the Ash comes out before the Oak, the harvest will be wet. (*Midland Counties*). "*Weather-lore.*"—R. INWARDS, 1869.

If the Ash is out before the Oak,
Colin's always in a soak ;
If the Oak before the Ash,
Dolly Scarr can get a wash.

When the Oak is out before the Ash,
You'll scarce have water for to wash;
If the Ash is out before the Oak,
You may put your clothes to soak.

Ash before Oak,
There'll be a smoke;
Oak before Ash,
There'll be a splash.

TWO OPPOSITE VERSIONS.

When the Oak before the Ash,
The summer will be splash, splash;
When the Ash before the Oak,
The summer will choke, choke.

When the Oak before the Ash,
Then you'll only get a splash;
When the Ash before the Oak,
Then you may expect a soak.

"*Weather Sayings.*"—W. ROPER, 1883.

TWO GREAT RAINFALLS, MAY 25TH—30TH, 1889.

THE following may or may not be a mere coincidence, but we call attention to the dates and leave others to theorize:—

SYDNEY, NEW SOUTH WALES, MAY 25TH TO 28TH.

We have been favoured by Mr. Cushing with copies of the *Sydney Morning Herald*, of May 29th and 31st, 1889, and from the ample reports therein contained, have drawn up the following *précis*:—

The Rainfall was	At Sydney Observatory	At Windsor Observatory	At Castle Hill Parramatta
Up to 9 a.m. on May 24th,	·05 in.	?	?
,, ,, ,, 25th,	2·23 ,,	?	2·01
,, ,, ,, 26th,	4·05 ,,	2·75	3·40
,, ,, ,, 27th,	4·69 ,,	5·65	6·82
,, ,, ,, 28th,	8·36 ,,	12·69	12·20
,, 10 a.m. ,, 28th,	·55 ,,		
Total.....	19·93	21·09	24·43

The greatest hourly fall at Sydney was from midnight on 27th to 1 a.m. on 28th, 2·42 in.

The stations whence large falls are reported seem to be all within 40 miles of Sydney. The totals up to 9 a.m. on 28th were:

Springwood...	16·50 in.	Sydney ...	19·38
Ryde	16·50 ,,	Windsor ...	21·09
St. Mary's ...	17·73 ,,	Burwood ...	21·80
Richmond.....	19·12 (12 in. in 24 hours up to 9 a.m., 28th).	Castle Hill.	24·43
Penrith	13·60 (from 1 p.m., 24th, to 1 p.m., 28th).		

RAINSTORMS IN HONG-KONG, MAY 29TH—30TH.

The following details of the disasters occasioned by the recent severe rainstorm in Hong-Kong, which are supplied from information from

Major Wilkinson, of the Royal Engineers, stationed there, will be interesting to many. Writing from Hong-Kong, on 30th May last, this gentleman said they had had unknown disasters there during the last 36 hours, from an unprecedented rainfall. The following he took from special editions:—From 7 a.m. on 29th to 7 a.m. on 30th, 24 inches of rain in 24 hours. From 7 a.m. on 29th to 0.30 p.m. on the 30th, 11·56 inches of rain in $5\frac{1}{2}$ hours. From 0.30 p.m. on 29th to 10.15 a.m. on the 30th, 13·2 inches of rain. Those who know what the usual rainfall is in certain places will appreciate the tale told in these figures. In Norfolk the average rainfall *per annum* is about 29 inches. Nearly two-thirds of this they had had in Hong-Kong in one day. The letter next describes scenes of which the writer was an eye-witness. When he arrived in the town at 9.30 a.m. the rain was coming down in torrents, and they were obliged to have their lamps alight in the office. About 11.30 a.m. the whole road in front of the office was flooded some 12 inches deep, and the flood was rushing through the ground floor towards the sea. The rain stopped, and the waters subsided rapidly. A large landslip had occurred on the Peak Tramway, carrying away a lot of the line, and it was impossible to say what damage had been done, but two months was about the time given to reconstruct the damaged line. The torrents coming down the hills had swept over all channels, and were rushing into a service reservoir about 400 feet above the sea. The reservoir consequently commenced to overflow at once, and the earthen dam outside the masonry retaining wall was washed bodily away. Great fears were entertained that the masonry would not stand, and inhabitants, especially the troops in a certain barrack, were warned to clear out of the valley. Had it burst, their subsequent experience had taught them that their precautions were absurdly inadequate, but luckily it did not burst. In the town large stone water drains were burst up, and down one street there was a wide rapid stream to the sea. In some places the ground had fallen, and huge yawning abysses were to be seen in places, and gas and water-pipes were laid bare. Having been much about all day, the writer retired early to rest, but was soon aroused, about five minutes to two, by a terrific clap of thunder, with a flash of lightning simultaneously, and he had heard that a house within twenty yards of his had been struck. The rest of the night was very much on the same lines. There seemed to be two or three storms raging on the peak for some time, and the flashes were not accompanied by thunder. Mount Kellet, a sharp peak under which he lived, seemed to be the centre of attraction. The roof of his house was leaky like a sieve, the hall was flooded, and at times the servants were shovelling the water out of the door; part of the coolies' quarters at the back had given way, and on examination he found their room minus an end wall, and the side wall bodily cracked. The end wall had gone down a landslip. This landslip also came pretty close to his dressing-

room. Going to look at the reservoir he saw the water flowing over the wall in a wide sheet, like a miniature Niagara.

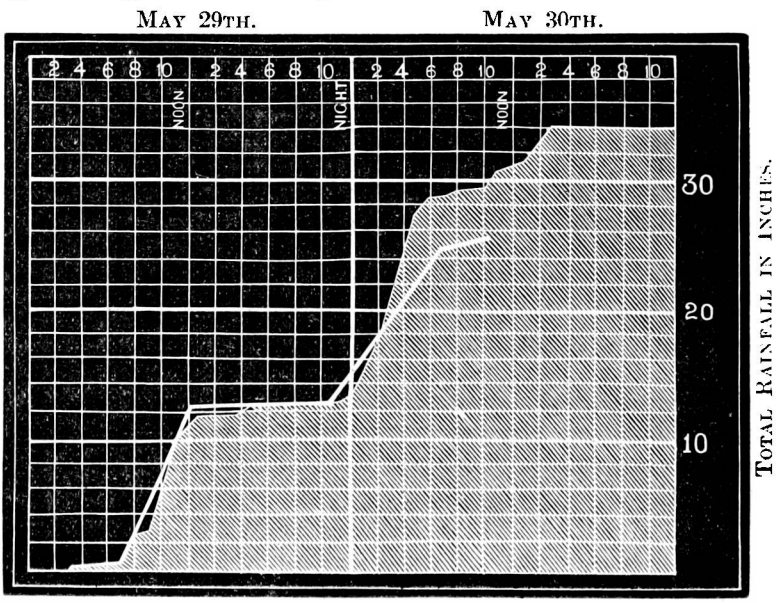
Writing from the same place on June 2nd, the writer gives a fuller description of the havoc caused. At Victoria there were scenes of havoc on all sides, the road nearly impassable in places, but the greatest damage was caused by a stream that came down past the Racket-court and between Murray-barracks and the general's house. This stream would have overflowed if the reservoir had burst. Towards the end of its course it runs in a wide granite block nullah, some 25 feet wide by 10 feet deep. The nullah is crossed by a bridge to carry the Queen's-road, and about 100 yards beyond the Queen's-road the stream discharges into the sea. Enormous quantities of sand were washed down, and a regular delta had been formed at its mouth. Huge rocks were carried down by the stream, and these, jamming against the bridge, dammed it, and the water rose and swept in torrents over the lower part of Murray-barracks, across and along Qeeen's-road into the North-barracks, and so found its way ultimately to the sea. It required six or eight men to roll over some of the big rocks that were carried down, and there were most likely bigger ones at the bottom of the nullah which they could not yet get clear. In the evening the stream was running over instead of under the bridge, and a large branch of the stream had been diverted by the embankments so as to run through the barracks, the idea being to divert the whole stream through the barracks till they could clear the bed of the nullah. To add to the confusion, a landslip occurred from the hill on which the general's house stands, rendering it unsafe. The damage done in the colony was immense. To see the finest city in the far East wrecked, was indeed sad. The greatest havoc had occurred down a ravine, called Glinealy, the prettiest place in Hong-Kong. Torrents swept down the ravine, breaking away bridges and carrying away roads. Large granite blocks were lying about the roads. The new water supply for Hong-Kong is stored in a large reservoir on the south side of the island, and an aqueduct leads the water through a tunnel and round the hills into the service reservoir mentioned above. Landslips occurred along the aqueduct and carried it away; and for a time the aqueduct, as well as the streams above, were flooding the Happy Valley. Water rushed through the cemetery, carrying away tombstones, bursting down the boundary wall, and spreading itself out on the low-lying ground, where once was a racecourse. The forts had stood the rain fairly well, although a good many of the earth slopes had slipped.

[The above is reprinted from the *Norfolk Chronicle*, because it is the clearest brief account that we have yet seen of the exceptional phenomenon. The article concludes by giving the hourly rainfall at the observatory, which we have also reprinted, adding the total up to the close of each hour :—

Hourly Rainfall at Hong-Kong Observatory.

	May 29th.		May 30th.	
	In hour. in.	Total. in.	In hour. in.	Total. in.
1 a.m.	—	—	1·80	15·41
2	—	—	2·30	17·71
3	·08	·08	3·20	20·91
4	·20	·28	3·40	24·31
5	·08	·36	3·00	27·31
6	·14	·50	1·63	28·94
7	·40	·90	·04	28·98
8	1·44	2·34	·58	29·56
9	·46	2·80	·02	29·58
10	3·07	5·87	·07	29·65
11	3·35	9·22	1·03	30·68
Noon	1·27	10·49	·55	31·23
1 p.m.	1·08	11·57	·55	31·78
2	—	11·57	1·20	32·98
3	—	11·57	1·12	34·10
4	·37	11·94	·01	34·11
5	·40	12·34	—	34·11
6	·03	12·37	—	34·11
7	·02	12·39	—	34·11
8	·07	12·46	—	34·11
9	·20	12·66	—	34·11
10	—	12·66	—	34·11
11	·11	12·77	—	34·11
Mid.	·84	13·61	—	34·11
Total	13·61	13·61	20·50	34·11

Considering the exceptional nature of this fall, we have prepared a diagram of it, on which will be noticed the records from an ordinary gauge, as quoted in the early part of Major Wilkinson's letter, as well as the above hourly values. It is satisfactory to note their general agreement.—ED.]



ABSOLUTE DROUGHTS AT ORLETON, 1885-1889.

To the Editor of the Meteorological Magazine.

SIR,—Observing in your magazine for this month many references to the long drought of 28 days which broke up here on the 9th of this month, I have looked through my meteorological diary from 1855, and find that, as the following have been the longest droughts that have occurred here in that period; the recent one is without precedent for 34 years.

Periods of more than 14 *days without rain.*

Year.	Months.	Days.	Year.	Months.	Days.
1857...	August and September.....	16	1870...	February and March.....	16
1858...	June and July	15	,, ...	September and October.....	21
,, ...	November	18	1871...	May	20
1861..	April	18	,, ...	November and December...	15
1864...	April and May	16	1874...	April and May	18
,, ...	July.....	17	,, ...	July	16
,, ...	September	22	1876...	May	17
1865...	June...	16	1877...	September and October.....	15
,, ...	September and October ...	16	1880...	June.....	17
,, ...	December	17	,, ..	August.....	16
1866...	May.....	17	1886...	September	15
,, ...	July.....	18	1887 ..	April	15
1868...	June.....	17	,, ...	June and July	25
,, ...	July and August	17	,, ...	July and August	15
,, ...	September	17	1888...	October	17
1869...	June and July	16	1889...	June and July	28
,, ..	August and September.....	22			

Believe me to be, yours truly, THOS. HENRY DAVIS.

Orleton, Tenbury, July 17th, 1889.

SALT HAILSTONES.

To the Editor of the Meteorological Magazine.

SIR,—In the last number of the *Meteorological Magazine*, the remarkable hailstorm which occurred at Tunbridge Wells and its neighbourhood on Friday, the 7th of June, is mentioned. Some of the hailstones were of the form and size of walnuts, others were like arrow-heads of ice, and the texture of many was similar to what is known as cat's ice. The hailstones were of immense size—the largest measuring four and a half inches in circumference, and being nearly two and a half inches in length.

In the description of the storm in the daily papers, the nature of the hailstones is not mentioned, but this was discovered by a singular incident. Mr. William Rogers, a friend of mine, of Ensfield Farm, Tunbridge, was walking over his farm at the time, accompanied by his dog. The dog seeing the large hailstones hopping about as they fell, ran after them, and began to eat some. This led my friend to taste them, and he found that they all tasted of salt. I thought that the nature of these hailstones was worthy of being recorded. Doubtless the water had been drawn up into the clouds by a water-spout.

J. WEBB.

Bristol, July 19th, 1889.

WATERSPOUTS.

To the Editor of the Meteorological Magazine.

SIR,—A few years ago I had, from Pembroke Dockyard, a notice of a shower of shells having fallen there in a thunder-storm, supposed to have been sucked up from the sea by a whirlwind. I wrote to Capt. Lecky, of Neyland House, to send me some of them, which he kindly did, and I found them to be very young common snail shells, so the mystery was easily explained. There had been a long continuance of dry weather; the snails crept forth in thousands from the extensive grass plots in the works (where ducks are not allowed) to enjoy the rain, which came down heavier than the poor things expected, and so they were drowned. A proof that stories of such-like phenomena require to be taken with a good pinch of salt until they receive reliable explanation. There cannot be a doubt that hay and such light matters have been carried some distance by whirlwinds, tornadoes, or cyclones, and that electrical discharges from the earth were mainly the cause, not only of tornadoes, but of such light matters being raised, or lifted to considerable elevations; but I have always understood that the elevation of water from the sea by a waterspout was a fallacy, and that the appearance of its being so raised was caused by the descending stream of heavy rain, almost, if not entirely, solid water, taking a spiral direction, which it would be compelled to do by atmospheric resistance, the illusion being explained in a popular way, by twirling a common corkscrew in the direction of inserting it into a cork, when the body of the screw assumes an ascending appearance. I take it that a waterspout is occasioned by an abnormal amount of electrical attraction between the cloud and the earth, the cloud being of extreme density, and the electric state of both the cloud and the earth being in extreme tension, the attraction between them being of sufficient strength to elevate the sea-surface into a small "hillock" of water at the place where it meets the descending stream of water from the cloud.

I make these remarks in consequence of the suggestion in your last issue at the end of the account of the "Dorsetshire Waterspout, June 7th," that the body of water "was probably sea-water, lifted from the English Channel by a whirlwind and dropped upon the top of High Stoy." I cannot see any occasion for such an idea, even if it were physically possible, and I think this enormous quantity of water can be accounted for otherwise than by referencce to the "English Channel."

The extremely dense cloud, or clouds, which doubtless contained many cubic miles of saturated air and dense fog, when concentrated by electrical attraction, and condensed in the usual course of the formation of rain, in such storms, would be doubtless quite sufficient in quantity; or to make it plainer, let us look at it in another form, and suppose these cubic miles of clouds to be filled with snow, and so concentrated; can anyone doubt there being enough to produce such effects, were that quantity of snow converted into water and discharged after the manner of waterspouts.

According to Mr. Glaisher's tables, a cubic foot of saturated air at 75° temperature contains ten grains of water, this gives 93,876 tons of water to the cubic mile. What quantity may be contained in the cube foot of thunder cloud, filled as it would be with solid globules of water in the form of heavy fog, may be left to the imagination of your readers, but I fancy it would be many times the above amount. ROBT. J. LECKY.

20thJuly, 1889.

[It is a very fortunate thing for the general advancement of knowledge that the least scrap of theory inserted in these pages is almost invariably pounced down upon by some one.

Greatly to our regret, we have never yet seen a waterspout, so we leave that phenomenon to those who have seen one, and who have studied the subject.

But when Mr. Lecky suggests that whirlwinds lift only light materials, hay, &c., we must meet the suggestion with a protest. Why, we have dozens of photographs of heavy materials lifted and carried far away. Has he forgotten the four-wheeled waggon at Calne, and the roofs at Baldock and at Walmer?

As to the lifting of water, quite recently we were speaking to a gentleman who had actually seen the water lifted out of a pond; and there is the Banbury case, concerning which we reprint* the details.

"Landspouts, like waterspouts, seldom come alone. Whilst the three men threshing beyond Newbottle were looking with astonishment at the phenomenon just described, they saw the water of a pool near Mr. F. Dagley's farmhouse, three-quarters of a mile east of Newbottle (near "Bunting House" of the Ordnance Map), rising in spray above the tops of the trees, and this, the pool itself being hidden by higher ground, they could not have done unless it had risen at least 60 feet. The water fell again a little further north. Three little boys (William Boyles, John Markham, and George Payne) had just taken dinner to the men, who, seeing that a storm was coming on, had sent them back to Charlton as quickly as possible. Just as they passed the pool, the water rose up into the air. Of course they ran away as fast as they could; but in a little while curiosity got the better of fear;—they looked back and saw the water falling again like rain. They thought the pool was half emptied, but the brook runs through it, so that it soon filled again. Mrs. Mitchell, living in a cottage near the school at Charlton, noticed both whirlwinds:—one going towards Newbottle, Spinney; the other, after violently agitating the trees near her house, taking the direction of Mr. Dagley's farm, where after drinking at the pool, it seems to have vanished."

If water be not raised in bulk by whirlwinds, it is not easy to see how the fishes got on to the roofs and into the gutters, and rain water tanks, at Mountain Ash.—ED.]

* From *Met. Mag.* Vol. viii. (1873), p. 168.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JANUARY, 1889.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	TotalRain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0–100	°	°	inches		0–10
England, London	53·1	31	22·0	7	41·8	32·4	34·4	89	76·8	16·4	·81	10	7·3
Malta	66·0	21	41·1	30	60·0	49·2	47·0	82	113·5	34·9	7·82	24	6·0
Cape of Good Hope	98·3	24	52·0	16	79·8	59·6	...	...	...	...	·08	1	2·0
Mauritius	84·4	2, 14	67·5	10	81 9	73·9	71·0	82	142·3	60·0	12·74	18	7·6
Calcutta	85·6	19	48·6	2	79·6	57·4	58·4	64	140·3	37·4	·16	4	1·1
Bombay	91·2	7	63·8	15	83·6	68·9	64·9	69	137·5	50·3	·00	0	0·5
Ceylon, Colombo	92·0	22	67·3	10	88·0	72·3	71·0	78	148·0	63·0	5·78	7	3·6
Melbourne	99·2	23	49·7	5	77·6	58·9	56·0	68	146·1	43·5	4·22	11	5·7
Adelaide	109·0	12	54·1	7	86·0	64·5	52·8	46	170·7	44·9	2·98	8	4·7
Wellington	80·0	24	52·0	21	70·6	57·0	55·6	77	139·0	42·0	2·24	9	4·0
Auckland	82·0	16	51·0	3	76·0	59·6	57·1	68	142·0	41·0	·64	5	3·5
Jamaica, Kingston	92·1	24	64·8	27	88·5	68·6	68·1	74	...	...	1·70	...	...
Trinidad	92·0	29	60·0	19	88·6	65·2	71·3	82	155·0	56·0	·94	...	...
Toronto	46·5	17	— 0·7	29	33·9	21·4	24·2	82	...	— 9·6	3·47	18	7·3
New Brunswick, Fredericton	46·9	10*a*	—19·0	31	28·5	10·9	19·0	76	...	...	3·24	12	5·6
Manitoba, Winnipeg	38·2	2	—36·8	18	15·6	—5·1	9·0	94	...	...	1·51	14	6·4
British Columbia, Victoria	52·0	3, 4	24·0	14	44·6	33·1	...	...	...	...	2·84	14	...

a And 17.

REMARKS, JANUARY, 1889.

MALTA.—Mean temp. 53°·8; mean hourly velocity of wind 10·7 miles. Sea temp. fell from 62°·5 to 60°·0. TSS on 5 days; days with rain double the average; R more than double the average. J. SCOLES.

Mauritius.—Mean temp. of air 0°·9 below, of dew point 1°·3 above, and R 5·92 in. above, their respective averages. Mean hourly velocity of wind 10·1 miles, or 1·2 below average; extremes 24·7 on 4th and 2·2 on 9th. Prevailing direction, S.E. by E. T and L on 5 days. C. MELDRUM, F.R.S.

Melbourne.—Mean temp. of air 1°·4, of dew point 3°·1, humidity 4, amount of cloud 0·6, and R 2·46 in. above their respective averages. Prevailing winds S. and S.W.; strong on 9 days. T, L on the 1st; L on 4th and 27th; T on 13th and 24th; heavy R on 1st, 2nd, and 3rd. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure ·049 in. above the average; mean temp. 0°·6 above average. On the 1st the long continued drought broke and heavy R (two to six inches) fell over the colony generally, commencing in the far north and extreme west on the 31st December. C. TODD, F.R.S.

Wellington.—Fine up to the 8th (excepting the night of 5th), with very strong N.W. wind. Showery during the middle of the month, with moderate wind. The latter part very fine until 30th, when heavy R fell. Prevailing wind N.W. L on 6th, 7th, and 17th. Mean temp. 1°·2 above average; R 1·26 in. below average. R B. GORE.

Auckland.—Fine, hot, and dry throughout the month, the total R being less than one quarter of the average. Mean temp. slightly above the average; pressure considerably above. T. F. CHEESEMAN.

SUPPLEMENTARY TABLE OF RAINFALL, JULY, 1889.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger Hall.	1·31	XI.	Castle Malgwyn	2·19
,,	Margate, Birchington...	2·88	,,	Rhayader, Nantgwillt..	5·35
,,	Littlehampton	2·56	,,	Carno, Tybrith	3·82
,,	Hailsham	3·90	,,	Corwen, Rhug	1·90
,,	Ryde, Thornbrough	2·36	,,	Port Madoc	3·27
,,	Alton, Ashdell.....	1·80	,,	I. of Man, Douglas	2·53
III.	Oxford, Magdalen Col...	2·69	XII.	Stoneykirk, Ardwell Ho.	2·91
,,	Banbury, Bloxham	2·03	,,	New Galloway, Glenlee	5·06
,,	Northampton	2·91	,,	Melrose, Abbey Gate...	4·86
,,	Cambridge, Beech Ho...	4·52	XIII.	N. Esk Res. [Penicuick]	4·30
,,	Wisbech, Bank House..	2·82	XIV.	Ballantrae, Glendrishaig	3·07
IV.	Southend	2·21	,,	Glasgow, Queen's Park.	1·95
,,	Harlow, Sheering	1·88	XV.	Islay, Gruinart School..	1·67
,,	Rendlesham Hall	2·59	XVI.	Dollar.....	1·77
,,	Diss	2·61	,,	St. Andrews, Pilmour Cot	2·82
,,	Swaffham	2·19	,,	Balquhidder, Stronvar..	1·78
V.	Salisbury, Alderbury...	2·41	,,	Dunkeld, Inver Braan..	3·67
,,	Warminster	2·49	,,	Dalnaspidal H.R.S. ...	2·73
,,	Bishop's Cannings	4·25	XVII.	Keith H.R.S.	3·41
,,	Ashburton, Holne Vic....	...	,,	Forres H.R.S.	1·46
,,	Hatherleigh, Winsford.	...	XVIII.	Strome Ferry H.R.S....	1·07
,,	Lynmouth, Glenthorne.	1·85	,,	Fearn, Lower Pitkerrie.	1·27
,,	Probus, Lamellyn	3·59	,,	Loch Shiel, Glenaladale	1·80
,,	Launceston, S. Petherwin	4·80	,,	N. Uist. Loch Maddy ...	·72
,,	Wincanton, Stowell Rec.	3·46	,,	Invergarry	1·24
,,	Taunton, Lydeard Ho...	2·65	,,	Loch Ness, Drumnadrochit	1·79
,,	Wells, Westbury.....	2·73	XIX.	Lairg H.R.S.	2·10
VI.	Bristol, Clifton	4·43	,,	Forsinard H.R.S.	..
,,	Ross	2·27	,,	Watten H.R.S.	2·05
,,	Wem, Clive Vicarage ...	2·85	XX.	Dunmanway, Coolkelure	1·67
,,	Cheadle, The Heath Ho.	2·75	,,	Fermoy, Gas Works ...	1·36
,,	Worcester, Diglis Lock	1·73	,,	Tipperary, Henry Street	2·06
,,	Coventry, Coundon	1·51	,,	Limerick, Kilcornan ...	2·44
VII.	Ketton Hall [Stamford]	1·60	,,	Miltown Malbay.....	3·77
,,	Grantham, Stainby	1·83	XXI.	Gorey, Courtown House	2·57
,,	Horncastle, Bucknall ...	1·41	,,	Navan, Balrath	·99
,,	Mansfield, St. John's St.	3·14	,,	Mullingar, Belvedere ...	2·62
VIII.	Neston, Hinderton	3·56	,,	Athlone, Twyford	2·19
,,	Knutsford, Heathside ...	4·39	,,	Longford, Currygrane...	2·40
,,	Lancaster, South Road.	2·87	XXII.	Galway, Queen's Coll...	2·65
,,	Broughton-in-Furness ..	3·16	,,	Clifden, Kylemore	4·93
IX.	Wakefield Prison	1·18	,,	Crossmolina, Enniscoe..	1·78
,,	Ripon, Mickley	2·46	,,	Collooney, Markree Obs.	2·51
,,	Scarborough, West Bank	2·98	,,	Ballinamore, Lawderdale	...
,,	East Layton [Darlington]	2·08	XXIII.	Warrenpoint	2·46
,,	Middleton, Mickleton..	2·52	,,	Seaforde	3·58
X.	Haltwhistle, Unthank..	4·28	,,	Belfast, New Barnsley..	...
,,	Shap, Copy Hill	3·46	,,	Bushmills, Dundarave...	3·77
XI.	Llanfrechfa Grange	3·77	,,	Stewartstown	3·94
,,	Llandovery	3·50	,,	Buncrana	3·26

JULY, 1889.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average. 1870–9	Greatest Fall in 24 hours. Dpth	Greatest Fall in 24 hours. Date.	Days on which .01 or more fell.	TEMPERATURE Max Deg.	Max Date	Min Deg.	Min Date.	No. of Nights below 32° In shade.	No. of Nights below 32° On grass.
			inches	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	2·64	+ ·17	·86	21	17	80·9	5	46·1	19	0	0
II.		Maidstone (Hunton Court)...	2·36	+ ·32	·50	16	16	...	..	...	...	...	...
,,		Strathfield Turgiss	2·19	— ·11	·55	21	20	79·0	6, 30	44·9	24	0	0
III.		Hitchin	4·30	+ 1·60	2·10	12	15	74·0	6, 30	46·0	18	0	0
,,		Winslow (Addington)	2·74	+ ·14	·51	13	14	80·0	6, 30	41·0	19	0	0
IV.		Bury St. Edmunds (Culford)	...	...	..	...	...	...	...	...	...	...	...
,,		Norwich (Cossey)	3·10	+ ·35	·77	21	15	78·0	1	44·0	24	0	0
V.		Weymouth(LangtonHerring)	2·18	...	·51	10	15	74·0	12	48·0	17*b*	0	0
,,		Barnstaple.....	3·44	— ·11	1·08	8	15	77·5	6	48·0	2	0	0
,,		Bodmin	3·87	+ ·43	·91	8	17	..	...	...	...	...	...
VI.		Stroud (Upfield)	4·04	+ 1·20	2·38	13	16	81·0	6*a*	53·0	24	0	0
,,		ChurchStretton(Woolstaston)	3·68	+ ·65	1·13	13	16	76·5	6	45·0	19	0	0
,,		Tenbury (Orleton)	2·22	— ·69	·68	13	12	80·8	6	37·0	19	0	0
VII.		Leicester (Barkby)	1·89	— ·85	·49	13	19	85·0	6	37·0	16	0	0
,,		Boston	1·69	— ·84	·70	13	11	90·0	5	43·0	8	0	0
,,		Hesley Hall [Tickhill].....	1·71	...	·43	10	14	81·0	31	40·0	24	0	0
VIII.		Manchester(PlymouthGrove)	3·14	— ·56	·64	21	17	81·0	30	42·0	7	0	0
IX.		Wetherby (Ribston Hall) ...	1·59	— 1·02	·32	25	9	...	...	...	...	...	...
,,		Skipton (Arncliffe)	3·97	— ·98	·73	24	16	83·0	6	36·0	8	0	0
,,		Hull (People's Park)	1·38	— 1·44	·32	9, 10	14	...	...	...	...	...	...
X.		North Shields	2·88	+ ·33	·61	25	15	78·5	6	41·5	8	0	0
,,		Borrowdale (Seathwaite).....	5·78	— 2·99	1·13	24	15	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	4·23	+ ·41	1·03	9	14	..	...	...	...	...	...
,,		Haverfordwest	2·62	— 1·31	·56	9	13	77·0	31	45·3	11	0	0
,,		Plinlimmon (Cwmsymlog) ...	4·24	...	·80	13	12	...	...	...	...	...	...
,,		Llandudno.....	1·91	— ·80	·50	23	12	78·6	31	45·7	24	0	0
XII.	SCOTLAND.	Cargen [Dumfries]	3·76	+ ·63	·98	10	14	76 8	31	39·0	8	0	...
,,		Jedburgh (Sunnyside).....	3·86	+ ·93	·93	10	15	770	31	40·0	9, 24	0	...
XIV.		Old Cumnock	3·12	+ ·02	·87	10	16	810	31	33·0	7	0	...
XV.		Lochgilphead (Kilmory)	·92	— 3·62	·28	24	11	...	...	..	...	..	...
,,		Oban (Craigvarren)	1·27	...	·39	10	12	75·2	4	46·6	18	0	...
,,		Mull (Quinish).....	1·62	...	·47	24	16	...	...	...	...	...	...
XVI.		Loch Leven Sluices	2·00	— 1·05	·50	11	7	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	2·55	— ·24	1·05	24	10	77·1	6	38·9	18	0	0
XVII.		Braemar	1·77	— 1·09	·65	24	16	76·0	4	36·0	24	0	7
,,		Aberdeen (Cranford)	3·41	...	·73	15	19	70·0	30	40·0	23	0	..
XVIII		Lochbroom	1·27	...	·32	16	12	...	...	...	...	...	...
,,		Culloden	1·57	— 1·21	...	...	...	78·0	31	41·0	3	0	0
XIX.		Dunrobin	1·34	...	·38	19	10	68·5	31	40·0	12	0	...
,,		S. Ronaldsay (Roeberry).....	1·05	— 1·56	·34	7	11	65·0	30	43·0	12	0	..
XX.	IRELAND.	Cork (Blackrock)	1·54	— 1·30	·47	22	8	80·0	1	42·0	12	0	...
,,		Dromore Castle	2·20	...	·47	24	13	76·0	17	44·0	16	0	...
,,		Waterford (Brook Lodge) ...	2·42	...	·58	19	15	78·0	6	43·0	11	0	...
,,		O'Briensbridge (Ross)	2·26	...	·74	24	13	77·0	4	48·0	27	0	...
XXI.		Carlow (Browne's Hill)	2·09	— ·47	·47	16	14	...	...	...	..	...	...
,,		Dublin (FitzWilliam Square)	2·57	+ ·15	·62	22	15	77·8	6	44·0	8	0	0
XXII.		Ballinasloe	1·91	— ·97	·45	24	11	71·0	2, 3	38·0	7	0	0
XXIII		Waringstown	3·82	+ ·24	1·55	10	15	81·0	6	39·0	7	0	0
,,		Londonderry (Creggan Res.).	3·33	...	·86	10	19	...	...	...	...	...	...
,,		Omagh (Edenfel).....	2·69	— ·56	·62	10	17	74·0	6	41·0	7	0	...

a And 29, 30. *b* And 22.

+ Shows that the fall was above the average; —that it was below it.

METEOROLOGICAL NOTES ON JULY, 1889.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—TSS on 21st and 23rd. T on 26th.

ADDINGTON.—The early part of the month was very fine, but R began on the 9th, and the showery weather which continued until nearly the end made the securing of the hay crop very tedious. R was, however, much needed, and of great benefit to both grain and root crops as well as meadow land. Frequent T and heavy R at times.

LANGTON HERRING.—R ·10 in. below the average. Mean temp. nearly equal to the average of 17 years. From June 14th to July 6th no R fell, giving an absolute drought of 22 days.

UPFIELD, STROUD.—Severe TS with heavy R from 3.30 to 5.30 p.m. on 13th; two trees struck by L within a mile.

WOOLSTASTON.—The long period of dry weather broke up on the 8th, and the remainder of the month was showery, R falling very heavily on 13th. TS on 23rd. Mean temp. 58°·4.

ORLETON.—The first 6 days were warm and dry, with a temp. above the average; from the 7th to the 29th there was generally much cloud during the days and the nights were clear and cold. It became warm again on the 30th, but the mean temp. was about 2°·3 below the average of 28 years, and was lower only in 1862, 1879, 1883 and 1888. The long drought (28 days without measurable rain) broke up on the 9th, and there were frequent falls of steady R after, with distant T occasionally, but no heavy storms. Distant T was heard on the 11th, 13th, 17th, 21st and 23rd. The bar. was very steady during the month, but below the average.

BARKBY.—Corn harvest just beginning at the end of the month. Hay harvest not completed in parts. Agricultural matters very fairly promising. T on 7 days.

WALES.

HAVERFORDWEST.—The first seven days, fine, dry and warm; from the 8th to 12th wet and showery; very close from the 12th to the 18th; cooler, but fine and dry with bright sunshine from the 19th till towards the end of the month, and the last three days warm, especially the 31st, which so far was the warmest day of the present summer. All crops look well, particularly oats and barley, but owing to the small R, potatoes and turnips are rather a failure as regards quantity. Temp. about the average; wind mostly N. and N.W., with some days S.W. to S.S.E. On the whole a fine summer month; temp. at or above 70° on 10 days. No T or L.

SCOTLAND.

CARGEN.—With the exception of a few warm days at the commencement and end of the month the temp. was unusually low, the mean from the 7th to the 25th inclusive being only 53°·1 or about 1° above the mean temp. of Sept., and the mean for the month 2°·1 below the average. The heaviest falls of R were generally accompanied by T, and were very partial. In the district 4·00 in. of R was reported to have fallen in less than two hours on the 11th near Thornhill, 14 miles N. of Dumfries. TSS on 10th, 13th and 16th.

JEDBURGH.—The weather was all that could be desired by almost everyone. The R in the early days of the month was of singular importance to cereal and root crops, which were in excellent condition at the close. The grain cutting promises to be fully a fortnight earlier than last year.

CRAIGVARREN, OBAN.—The drought continued throughout the month, accompanied by bright sunshine; the little grass was burnt up, and most of

the wells believed to be constant, failed. Such a drought has not been known here before, as the finest weather usually breaks in July. Hot easterly winds prevailed at the close of the month.

QUINISH, MULL.—A hot, dry month with much sunshine. Great scarcity of water in the Hebrides generally, owing to the long-continued drought.

LOCHBROOM.—The last three months were probably the driest consecutive three that have occurred during the last half century. It is now beginning to tell most disastrously on the crops, and especially on the grazing. Some turnip fields actually have not yet sprouted, while those sown very early are looking well.

CULLODEN, INVERNESS.—A fine month, but R much needed. Turnip crop very poor.

DUNROBIN.—A very dry month; pastures in most cases very much dried up. Hay crop light and secured earlier than in any season for the last 20 years.

ROEBERRY.—A very fine month throughout, with a small R.

IRELAND.

CORK.—A very fine month, with the exception of a few overcast days and distant T on the 13th. R 1·16 in. less than the average of 24 years.

WATERFORD.—R ·57 in. below the average; mean temp. 58°·6.

ROSS.—The fine weather of June continued to the 11th of July, then some much-needed R fell in frequent light showers till the 24th, when there was a good fall of nearly three-quarters of an inch. The month closed with splendid harvest weather.

DUBLIN.—Warm and fine at the beginning and close, this month, on the whole, proved changeable, showery, and cool, with a great preponderance of N.W. winds. On the whole, the weather was favourable, from both a sanitary and an agricultural point of view. High winds on eight days, moderate gale on the 21st and 27th. Temp. reached 70° in screen on three days. The drought of June continued up to 6th of this month.

EDENFEL, OMAGH.—The drought which commenced on June 15th continued absolute until the 7th inst., lasting 22 days, thus covering a longer period than has been before recorded in the 25 years during which observations have been taken here. The remainder of the month was generally fresh and cool, with occasional heavy R, proving of the utmost benefit to grass and green crops, and not sufficiently persistent to impede the hay harvest. A slight frost occurred on the 7th, blackening the potato tops in low and damp situations.

EXCEPTIONAL RAINFALL, JULY 13TH, 1889.

To the Editor of the Meteorological Magazine.

SIR,—Before a carefully-observed torrential rainfall here passes into oblivion—as did a similar one 17 years ago, which I did not know then was so extraordinary—please note that on Saturday last, July 13th, between 4.35 and 5.40 p.m., 3·65 inches of rain fell here during a thunderstorm. I carefully measured and weighed it as a check at the time. The rainfall day gave 3·83 inches. I see that 3·65 in. in 65 minutes just makes your curve of extremes in *British Rainfall*, 1887, p. 134, complete.—Yours truly,

T. H. G. NEWTON.

Barrells, Henley-in-Arden, 17th July, 1889.